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10/527,115	03/08/2005	Hans Lobl	DE 020206	9528

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NXP, B.V.
NXP INTELLECTUAL PROPERTY DEPARTMENT
M/S41-SJ
1109 MCKAY DRIVE
SAN JOSE, CA 95131

EXAMINER	
NADAV, ORI	

ART UNIT	PAPER NUMBER
2811	

NOTIFICATION DATE	DELIVERY MODE
11/06/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

Office Action Summary	Application No.	Applicant(s)	
	10/527,115	LOBL ET AL.	
	Examiner	Art Unit	
	Ori Nadav	2811	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 September 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 September 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The indicated allowability of claims 4 and 5 is withdrawn in view of the newly discovered reference(s) to Wajid, Sawai et al., Nishihara et al. and Yee. Rejections based on the newly cited reference(s) follow.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the bulk acoustic wave filter comprising at least two bulk acoustic wave resonators which comprise means for suppression of pass-band ripple in a ladder or in a lattice type configuration, as recited in claim 4, and layer 7, as referenced numbered in figure 3, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> **The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.**

Claims 4-5 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

There is no explicit description in the specification for a bulk acoustic wave filter comprising at least two bulk acoustic wave resonators which comprise means for suppression of pass-band ripple in a ladder or in a lattice type configuration, as recited in claim 4, in such as way as to enable an artisan how the claimed layers are connected to each other in a ladder and in a lattice type configuration.

Claims 2 and 4-5 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter

which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

There is no adequate description in the specification for a bulk acoustic wave filter comprising at least two bulk acoustic wave resonators which comprise means for suppression of pass-band ripple in a ladder or in a lattice type configuration, as recited in claim 4, in such a way as to the explicit structure of the claimed device.

There is no support in the disclosure for a device comprising a roughened rear side of the basic substrate (5), as recited in claim 2, AND {an absorbing layer (6) disposed on the rear side of the substrate (5) or an absorbing layer (7) disposed on the front side of the substrate (5) below a Bragg reflector (4)}, as recited in independent claim 1.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> **The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.**

Claims 1-3 and 5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claimed limitations of a "resonator comprising at least a bottom electrode (3), a piezoelectric layer (2) and a top electrode (1), a substrate (5)", as recited in claim 1, are unclear as to the location of the substrate and the piezoelectric layer with respect to the claimed resonator.

The claimed limitation of "and/or", as recited in claims 3 and 5, is unclear as to which elements are present in the claimed structure.

The claimed limitation of "a bulk resonator as defined in one of the preceding claims", as recited in claim 5, is unclear as to the dependency of the claim.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 and 3, as best understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Wajid (5,233,261).

Wajid teaches in figure 1 and related text A bulk acoustic wave (BAW) resonator comprising at least a bottom electrode 14, a piezoelectric layer 11 and a top electrode 16, a substrate 11 and means 12, 13 for absorbing or scattering spurious modes, wherein the means for absorbing or scattering spurious modes comprises at least one of the following:

a roughened rear side of the basic substrate (5),

an absorbing layer (6) disposed on the rear side of the substrate (5) and

an absorbing layer (7) disposed on the front side of the substrate (5) below a Bragg reflector (4), wherein

the rear side absorbing layer (6) and/or the front side absorbing layer (7) are/is selected from the group of glue such as epoxy glue, elasticoviscous materials such as polyimide, rubber, silicon rubber, plastic materials, porous media like aerogel or xerogel or porous thin films.

Claims 1 and 3, as best understood, are rejected under 35 U.S.C. 102(e) as being anticipated by Sawai et al. (6,313,569).

Sawai et al. teach in figure 1 and related text A bulk acoustic wave (BAW) resonator comprising at least a bottom electrode 8, a piezoelectric layer 2 and a top electrode 9, a substrate 3 or 4 and means 24 for absorbing or scattering spurious modes, wherein the means for absorbing or scattering spurious modes comprises at least one of the following:

a roughened rear side of the basic substrate (5),

an absorbing layer (6) disposed on the rear side of the substrate (5) and

an absorbing layer (7) disposed on the front side of the substrate (5) below a Bragg reflector (4), wherein

the rear side absorbing layer (6) and/or the front side absorbing layer (7) are/is selected from the group of glue such as epoxy glue, elasticoviscous materials such as polyimide, rubber, silicon rubber, plastic materials, porous media like aerogel or xerogel or porous thin films.

Claims 1-3, as best understood, are rejected under 35 U.S.C. 102(e) as being anticipated by Nishihara et al. (6,734,763).

Nishihara et al. teach in figure 21 and related text A bulk acoustic wave (BAW) resonator comprising at least a bottom electrode 821, a piezoelectric layer 822 and a top electrode 823, a substrate 810 and means (rough substrate) for absorbing or scattering spurious modes, wherein the means for absorbing or scattering spurious modes comprises at least one of the following:

a roughened rear side of the basic substrate (5),

an absorbing layer (6) disposed on the rear side of the substrate (5) and

an absorbing layer (7) disposed on the front side of the substrate (5) below a Bragg reflector (4), wherein

the rear side of the basic substrate (5) is rough, and wherein

the rear side absorbing layer (6) and/or the front side absorbing layer (7) are/is selected from the group of glue such as epoxy glue, elasticoviscous materials such as polyimide, rubber, silicon rubber, plastic materials, porous media like aerogel or xerogel or porous thin films.

Regarding the process limitations recited in claim 2 ("the rear side of the basic substrate (5) is roughened by means of etching or blasting"), these would not carry patentable weight in this claim drawn to a structure, because distinct structure is not necessarily produced. Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re

Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in □product by process□ claims or not. Note that the applicant has the burden of proof in such cases, as the above case law makes clear.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> **(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.**

Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wajid, Sawai et al. or Nishihara et al. in view of Yee (4,028,647).

Wajid, Sawai et al. or Nishihara et al. teach substantially the entire claimed structure, as applied to claim 1 above, including means for suppression of pass-band ripple, but except using the device as a bulk acoustic wave filter comprising at least two bulk acoustic wave resonators in a ladder or in a lattice type configuration.

Yee teaches using the device as a bulk acoustic wave filter comprising at least two bulk acoustic wave resonators in a ladder or in a lattice type configuration.
It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use prior art's device as a bulk acoustic wave filter comprising at least two bulk acoustic wave resonators in a ladder or in a lattice type configuration, in order to improve the filtering characteristics of the device which it is used in a filter application.

Regarding claim 5, prior art teaches a top electrode is made of a metal material such as aluminum (Al) and/or the piezoelectric layer is made of aluminum nitride (AlN), zinc oxide (ZnO) or lead zirconate titanate (PZT) and/or the bottom electrode is made of a metal material such as Molybdenum (Mo), Platinum (Pt) or Tungsten (W).

Response to Arguments

Applicant's arguments with respect to claims 1-5 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ori Nadav whose telephone number is 571-272-1660. The examiner can normally be reached between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on 571-272-4670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

O.N.
10/30/07

ORI NADAV
PRIMARY EXAMINER
TECHNOLOGY CENTER 2800